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SOUTHWEST FISHERIES CENTER

MONTHLY REPORT - AUGUST 1978

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NOAA/NMFS

TO OUR READERS:

In the future, to cancel delivery of the Southwest Fisheries Center (SWFC) Monthly Report, or to change the delivery address, please notify by writing: Editor, Southwest Fisheries Center, P.O. Box 271, La Jolla, California 92038.

Izadore Barrett, Director, SWFC
John F. Carr, Deputy Director

SOUTHWEST FISHERIES CENTER
LA JOLLA, CALIFORNIA

HONOLULU LABORATORY
LA JOLLA LABORATORY
TIBURON LABORATORY
PACIFIC ENVIRONMENTAL GROUP

MONTHLY REPORT - AUGUST 1978

STATUS OF PUBLICATIONS

Approved by Center Director

Adams, P. Morphology and distribution patterns of several important species of rockfish (Genus: Sebastes). To be submitted to Marine Fisheries Review.

Lenarz, W.H. Shortbelly rockfish (Sebastes jordani): a large unfished resource in waters off California. To be submitted to Marine Fisheries Review.

Owen, R.W. Midwater microlayering of biological particles in ocean waters. For publication in Science.

Translations

Tanaka, Tamotsu. 1978. Atlas of skipjack tuna fishing grounds in southern waters, 1977 fishing season (June 1977-April 1978). Tohoku Reg. Fish. Res. Lab. [8 pages text, 16 charts.] (Translated from Japanese by Tamio Otsu, 1978, 33 p., Translation No. 30.)

Suisan Shuho (The Fishing and Food Industry Weekly). 1978. Skipjack tuna joint-venture operations are generally doing well--A glance at Japan's skipjack tuna and other tuna joint-venture operations. Suisan Shuho (The Fishing and Food Industry Weekly) No. 825, p. 44-49. March 25, 1978. (Translated from Japanese by Tamio Otsu, 1978, 10 p., Translation No. 31.)

This report does not constitute publication and is for information only.

HONOLULU LABORATORY

RESOURCE ASSESSMENT AND DEVELOPMENT INVESTIGATIONS (RADI)

Assessment of the Seamount Armorhead Resources Completed

Dr. Jerry Wetherall, Leader, Fishery Management Resource Task, completed an assessment of the pelagic armorhead, Pentaceros richardsoni, resources in the mid-Pacific seamounts. The results are included in a background document, "Assessment of the armorhead stock on the mid-Pacific seamounts," that was prepared for the Western Pacific Regional Fishery Management Council's Seamount Resources Planning Team.

Briefly, Wetherall noted that two "types" of armorhead are generally recognized: a "fat type" which has a relatively deep body and blue-over-white coloration typical of many surface swimming fishes, and a "lean type" which has a much shallower body and uniformly gray coloration. It was assumed that the "fat type" and "lean type" fish are from different stocks and that the Hancock Seamount armorheads inside the U.S. Fishery Conservation Zone are members of a single stock of lean armorheads occupying the entire seamount chain. The small numbers of the fat type armorheads occurring on the seamounts are assummed to be of negligible consequence.

Using smoothed effort statistics, Wetherall determined that the best estimates of maximum sustainable yield and the associated optimum fishing effort were 52,600 MT (metric tons) and 2,400 trawling hours, respectively. He based his calculations on a hypothesis that a single armorhead stock occupies the entire mid-Pacific range.

Public Meetings and Other Activities Continue in Fish Aggregation Project

Walter Matsumoto, Fishery Biologist, reported the continuation of public meetings to discuss the proposed statewide fish aggregation buoy system. In addition to Matsumoto, Dr. Stanley Swerdloff, Hawaii State Marine Affairs Coordinator's Office, and Alvin Katekaru, Hawaii Division of Fish and Game, participated in the meetings at Kona and Hilo, Hawaii. These meetings are part of a continuing effort to obtain input from user groups, particularly in determining the best sites for deploying additional fish aggregating devices in the users' fishing areas.

Matsumoto is using the information gathered at these public meetings to prepare a proposal for a statewide fish aggregation system. The proposal will be submitted to the Hawaii Division of Fish and Game for approval and eventual incorporation into their fishery development program.

Activity involving buoys already in place included a 2-day buoy monitoring cruise on a chartered vessel, the Kamalii Kai Too on August 17 and 18.

Analysis of Bottom Fish Fisheries Begun

Steve Ralston, a University of Washington School of Fisheries graduate student who is under contract to the Western Pacific Regional Fishery Management Council (WPRFMC), has been working under the direction of Dr. Robert A. Skillman, Chairman of the Bottom Fish and Planning Team, on various fishery statistics on bottom fishes. Ralston completed a field trip to Pago Pago, American Samoa, where he met with personnel of the Office of Marine Resources and gathered available statistics on the bottom fish fishery.

Most of Ralston's time has been spent examining Hawaii State records on bottom fishes. Summarization of the basic catch data has brought out significant differences in the island distribution, inshore/offshore distribution, historical trends, and seasonal trends among the various species. Work is now progressing on the determination of a usable measure of fishing effort based on commercial fishing licenses and number of catch reports. A negative relationship usually exists between stock density and fishing effort when a fishery is having a significant effect on a stock. For the Hawaiian fishery, just such a relationship has been found using the available crude estimates of fishing effort.

Meetings to Discuss Northwestern Hawaiian Islands Study Continued

Participants in the cooperative study of the NWHI met during the month to discuss the productivity study of the Hawaiian Archipelago that is being conducted by Dr. Jed Hirota, University of Hawaii Sea Grant Program. Hirota's presentation included a discussion of (1) his goals in doing a comparative study of the northwestern low islands versus the southeastern high islands, (2) the sampling program to be carried out and some of the major features being examined, (3) the spewal problem of coastal water systems and "small scale" island effect phenomena, and (4) faunal assemblages of zooplankton, including larval fishes.

Following Hirota's presentation, the discussions touched on how his study should be coordinated with other projects and how small-scale island coastal water circulation systems and patchiness should be addressed. The problem of better coordination of goals and objectives into a more "coherent systems study" and coordination of the Townsend Cromwell cruises was also discussed.

Development of Honolulu Laboratory Tuna Research Plan Underway

Last month several Honolulu Laboratory staff members met with Dave Mackett, Planning Officer for the SWFC, to bring together the Laboratory's tuna research plans in a comprehensive document. Following this meeting, Dr. Jerry Wetherall and Dr. Robert A. Skillman developed a PERT chart for the tuna stock assessment planning stream. Skillman also spent some time at the Center working with Mackett on the plan. The tuna plan consists of six projects or planning streams: (1) support of international regulatory commissions, specifically the to-be-formed South Pacific Fishery Agency, (2) tuna stock assessment (3) economic and fishery evaluation, (4) fish-fishery-environment modeling, (5) tuna fishery development, and (6) recreational fisheries. The first draft, which consists of a description of the overall program and the first two planning streams, has been completed.

Townsend Cromwell Departs on Cruise to NWHI

The NOAA ship, Townsend Cromwell, departed Honolulu on August 4 on cruise 78-03 (TC-80), the second in a series of cooperative cruises to survey and assess the offshore and nearshore fishery and wildlife resources of the NWHI. Participating in the cruise are personnel from the Honolulu Laboratory, Southwest Fisheries Center, the Hawaii Division of Fish and Game, and the U.S. Fish and Wildlife Service, under the provisions of the Tripartite Cooperative Agreement. The scientific field party from the Honolulu Laboratory consists of Chief Scientist James H. Uchiyama and Cooperating Scientist Alan C. Solonsky, a student in the Marine Options Program at the University of Hawaii. Uchiyama reported that some relatively good catches were made by handline fishing around French Frigate Shoals and Maro Reef. Sea bass, Epinephalus quernus, and pink snapper, Pristipomoides microlepis (= P. filamentosus) occurred in greatest numbers in the catches. Trolling catches, predominantly kawakawa, Euthynnus affinis, and skipjack tuna, Katsuwonus pelamis, were also good around these islands.

Relation Between Moon Phase and Lobster Catch Investigated

Victor A. Honda, Research Assistant, investigated the association between moon phase and spiny lobster catch rates of all research and commercial fishing cruises to the NWHI. He reported that although the available data for certain areas are insufficient for a thorough analysis, it does not appear that catches are associated in any way with moon phase.

Plans Being Readied for Another Cruise to NWHI

In preparation for a forthcoming cruise of the Townsend Cromwell, Richard Uchida, Leader, Insular Resources Task, prepared a preliminary draft of the cruise instructions for the cruise after consulting with Dr. Jed Hirota, Institute of Marine Biology, University of Hawaii and Messrs. Kenji Ego, Henry Sakuda, and Paul Kawamoto, Hawaii Division of Fish and Game. The missions of the cruise (TC 78-04, October 8-December 12, 1978) are to conduct (1) resource surveys and assessment in the NWHI, (2) primary and secondary productivity sampling throughout the Hawaiian Archipelago, and (3) orientation surveys of the fish and wildlife resources at Pearl and Hermes Reef for government officials and legislators of the State of Hawaii.

Crustaceans Collected on Western Pacific Cruise Identified

Robert Moffitt, Research Assistant, worked on the identification of shrimps and crabs collected around Guam and the Northern Mariana Islands during Townsend Cromwell cruise 78-02. Moffitt reported that Heterocarpus ensifer and H. laevigatus were the two most common pandalid shrimps in the catches and two other species H. sibogae and H. dorsalis were caught at three trapping stations. Other species in the catches included: Plesionika martia, P. ensis, P. longirostris, Systellaspis cristata, Aristaeus semidentatus, Acanthephyra exima, Haliporus aequalis, Chalaenopagrus andersoni, and Munida sp.

Analysis of Data and Material Collected in NWHI Continues

Other personnel in the Insular Resources Task continued work on data and biological material collected in the NWHI. Research Assistant Darryl T. Tagami computed linear regressions of fork length on standard length, and standard length on weight for thick-lip carangid (Caranx cheilio), amberjack, red snapper (Etelis marshi), pink snapper (P. microlepis), and sea bass (E. quernus). Mr. Tagami also completed an analysis of modes detected in the length frequencies of spiny lobster, Panulirus marginatus, by the ENORMSEP computer program and checked into the use of the 3-dimensional plotting program, SPLOT.

Research Assistants Jeffrey D. Sampaga and Bert S. Kikkawa continued to process and read otoliths during the month. Both whole mounts and transverse sections were prepared of otoliths collected from mackerel scad (Decapterus russelli), armorhead (Pentaceros richardsoni), amberjack, pink snapper, red bigeye (Priacanthus cruentatus), blue-line snapper (Lutjanus kasmira), sea bass (Caprodon schlegelii) and surgeonfish (Acanthurus olivaceus).

Thomas S. Hida, Fishery Biologist, assisted by Research Assistant Robert B. Moffitt, identified fishes found in material regurgitated by seabirds (shearwaters) and from stomachs of amberjack, Seriola dumerilii. Paul M. Shiota, Research Assistant, completed sorting and volumizing plankton samples from TC 77-02 (TC-75), and began processing plankton samples from 78-01 (TC-78). Glenn Higashi, Research Assistant, completed a cruise report for a commercial fishing trip on the FC Easy Rider on which he served as observer and completed analysis of stomach samples from blue-line snapper and pink snapper, Pristipomoides sieboldii.

Work Continues on South Pacific Albacore Study

Work continued on computer programming for the South Pacific albacore study in preparation for the tuna stock assessment workshop scheduled for June 1979. Fletcher Riggs, Fishery Biologist, has completed a series of programs that will determine the geographic range of a set of catch/effort statistics, print catch, effort, and CPUE by species or species groups by specified rectangles for specified areas of the ocean, and supply these data to contour plotting routines.

Estimated Skipjack Tuna Landings Continue Below Long-Term Average

The August 1978 Hawaii landings of skipjack tuna were estimated at 256 MT, which is 282 MT below the landings for the same period in 1977 and 435 MT below the 1948-77 long-term average for the same period. The cumulative landings from January through August were estimated at 2,318 MT, which is 499 MT below last year's landings for the same period and 1,035 MT below the 1948-77 long-term average for the same period.

FISH-ENVIRONMENT INVESTIGATIONS (FEI)

Biological Observations Made at Billfish Tournament

Heeny Yuen, Leader of the Recreational Fisheries Task, and Robert Humphreys, Research Assistant, collected catch and effort data and other biological data at the Twentieth Hawaiian International Billfish Tournament at Kailua-Kona, Hawaii, from July 29 to August 5.

In addition to the usual length, weight, sex and stomach contents data collected at all the tournaments, Yuen and Humphreys collected dorsal fin rays from blue marlin and otoliths from small mahimahi found in the billfish stomachs for age determination studies.

The tournament was highly successful, and provided a number of records. More blue marlin, shortbill spearfish, and total billfish were caught during this tournament than at any of the past tournaments. The catch included 105 blue marlin, 9 shortbill spearfish, and 2 striped marlin for a total of 116 billfish. The 65 teams that participated in the tournament also caught more fish per team than in past tournaments.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

ALBACORE FISHERIES PROGRAM

Significant Improvements in Satellite Measurement Data

The Albacore Fisheries Program has realized significant improvements in the position gridding of satellite visual and infrared measurement data. NOAA Corps Officer Lt. David McConaghy reports that after incorporating improvements in techniques, a positioning accuracy of $\pm$ .02° of latitude and .04° of longitude is now possible in coastal regions. Lt. McConaghy and Mr. Robert Kirkham of the Inter-American Tropical Tuna Commission (IATTC) presented these results in a review of the progress and activities-to-date in the transfer of IATTC satellite programming to the Center attended by Dr. Reuben Lasker, Dr. R. Michael Laurs, Mr. Ronald Lynn, Mr. Forrest Miller, Mr. Kenneth Bliss, and Mr. Richard Evans. Additionally Lt. McConaghy and Mr. Kirkham presented early results on the calibration of satellite derived temperatures using ground truth data. Finding appropriate ocean temperature measurements taken simultaneously with any given satellite pass is difficult. Infrared temperatures from one Coast Guard offshore overflight (calibrated separately with ocean temperatures) within two days of a chosen satellite pass have been used for calibration with moderate success. Additional data sets will be sought and tested.

LARVAL FISHES, COASTAL EAST PACIFIC PROGRAM

Manuscripts Underway on Analysis of Growth & Development in Larvae

James Zweifel, Mathematician, and John Hunter, Leader of the Larval Fishes, Coastal East Pacific Program, have completed and submitted for inhouse review a manuscript on the temperature specific equations for growth and development of anchovy during embryonic and larval stages. The manuscript provides evidence for the usefulness

of the Gompertz equation to model anchovy growth through the egg development stage and pre- and post-feeding larval stages. In addition, evidence is given for the usefulness of the same model in slowly developing fish embryos.

In addition, Zweifel has completed a revision of a manuscript of allometry in larval fish which describes a procedure based on the Gompertz equation which may be used in the early life stages to express the length-weight and body part relationships, which often fail to follow the traditional power law $y=ax^b$. He has also completed a manuscript on the estimation of the parameters of functional relationships when the underlying sampling distributions can be represented by the negative binomial model. The procedure allows for variations in the actual or "effective" size of the sampler, a situation that arises often, if not always, in sampling natural populations.

Zweifel is continuing work on a manuscript which describes the use of the negative binomial model for the analysis of egg and larval survey data. The work includes estimates of abundance and mortality and describes the procedures by which corrections for variations in the "effective" size of the sampler are calculated and utilized. Evidence is presented to show that mortality rates in the early larval stages may be explained as part of a continuously decreasing age dependent mortality function.

Theory Substantiated on Microaggregation of Larval Fish Food

Dr. Robert Owen, Oceanographer, completed and sent to Science Magazine his manuscript, "Midwater microlayering of biological particles in ocean waters," which substantiates the theory developed here by Dr. William Vlymen, former NOAA post-doctoral fellow, that food of anchovy larvae must be aggregated on very small space scales.

Dr. Owen began a manuscript, "Ocean eddies induced by islands of the Californias." The work is principally a review but presents some new data on the more organized aspects of the vagaries for which flow in the California Current system is well known, and the degree of response to the presence of islands, notably those of the Southern California Bight.

Dr. Owen has also been asked to contribute a chapter on ecosystem effects of oceanic fronts, eddies, and island wakes for a book, "Analysis of Marine Ecosystems" (Academic Press) to be edited by Dr. Alan Longhurst of Canada's Bedford Institute of Oceanography. The book will cover current concepts, functions, modelling, and experimental studies of marine ecosystems, and will be used by graduate students and research workers.

NRC Research Associate Studies Energetic of Fish Locomotion

Dr. Daniel Weihs started a year's visit to the Southwest Fisheries Center as a National Research Council Senior Resident Research Associate on August 15. Dr. Weihs is an Associate Professor of Aeronautical Engineering at Technion-Israel Institute of Technology, Haifa, Israel and has been interested in the hydrodynamics and energetic of fish locomotion for some years.

This month, he defined two projects and work was started on both. The aim of the first project is to understand the change in swimming behavior of anchovy (Engraulis mordax) as they grow from the larval stage to the adult phase. Mature anchovy swim in the beat-and-glide mode, i.e., swimming motions are performed periodically with interspersed gliding. Yolk-sac larval anchovy, on the other hand, swim by bursts, i.e., moving very actively for some time then resting. The former mode has been shown to be energetically advantageous (Weihs, J. Theor. Biol. 48, 215, 1974); Dr. Weihs is now seeking the reason for the differing behavior during the larval phase. Preliminary results already obtained tend to show that the increased influence of water viscosity has a greater influence at the smaller size range of larvae, and that energetic considerations may be the cause for this behavior.

The second project also deals with anchovy larvae at the yolk-sac stage of development. These exhibit a motionless sinking behavior, interrupted by vigorous swimming in random directions. Hunter (Fish. Bull. 70, 821, 1972) suggested that this may be a respiratory activity since the swimming behavior increased when oxygen levels in the water were reduced. The present study is planned to check this hypothesis quantitatively, both experimentally and theoretically.

Changes Made in Phytoplankton and Zooplankton Culturing

During the early part of July the entire rotifer culture set-up in the La Jolla Laboratory aquarium was moved to the southwest corner of the aquarium. The move took approximately 1 month and during that time the production of rotifers dropped to a minimum. Presently, the culture system is in full operation and produces an average of 15 million rotifers per day from a total culture volume of 2,000 liters.

The culturing of the copepod Tisbe furcata is continuing, but on a small scale. The system of culturing the copepod in tanks of algae held at 16-18°C has been abandoned for the time being. Biological Technician Bob Salomens has suggested a different way of culturing the copepod. Salomens suggested that a copepod tank be set up so that

fresh sea water could be circulated through the tanks to remove old algae and metabolities, and generally to freshen tanks. Salomens also offered the observation that varying the algal diet rather than providing a single alga as food might increase the nutritional value of the diet and offer proper food particle sizes for each of the three life stages of the copepod. A tank has been set up incorporating both the circulation of fresh sea water and a varied algal diet. The result has been more promising in terms of numbers of copepods produced, ease of harvesting and health of copepods than anything tried in the last one and one half years. A second tank has been set up recently and if this tank also produced a healthy, expanding population, the possibility of expanding the systems will be examined.

* * * * * * * * * *

Fishery Biologist Gail Theilacker is presently working on two papers: "Preservative shrinkage of larval fish: laboratory vs. field" to be presented at CalCOFI, and "Effect of feeding history and egg size on morphology of jack mackerel, Trachurus symmetricus, larvae" to be presented at the second conference on the Early Life History of Fish, to be held at Woods Hole in April 1979.

"Preservative shrinkage of larval fish" will: 1) compare measurements at the same developmental stage of live, laboratory preserved anchovy larvae and net-treated and preserved (i.e., "field-collected") anchovy larvae, 2) graduate relation between anchovy head length, body depth, and eye diameter with standard length (to 25 mm), 3) present mathematical models that predict live anchovy standard length and body part size from measurements of "field-collected" larvae, and 4) test models by comparing relation between model-predicted live body part sizes (using Ahlstrom's unpublished measurements of 1955-1957 CalCOFI-collected anchovy larvae) with observed, live body part measurements of anchovy reared in this study.

In the paper on jack mackerel, the probably feeding condition of the larvae--such as a low or high density diet, delayed feeding, starving--are correlated with the morphological condition of the larvae. A stepwise discriminant analysis that uses a combination of standard length and four body part measurements is used to estimate morphological condition. These analyses show that the morphometric relation between larval fish body parts is a sensitive predictor of feeding history.

Feeding experiments were conducted with larvae hatched from .90 mm diameter eggs. Larvae were 2.1 mm standard length at hatching. In experiments reported at an earlier date, the egg diameter was 1.00 mm, and the larvae hatched at 2.8 mm standard length.

* * * * * * * * *

Keith Parker assisted Pete Paloma, Fishery Biologist at the La Jolla Laboratory, in a discriminant analysis of Pacific mackerel (Scomber japonicus) larvae to determine if feeding and starved larvae can be distinguished. Length measurements of 10 internal organs were used in the analysis. 90% discrimination was achieved in preliminary analyses.

COMMERCIAL AND RECREATIONAL FISHERIES RESEARCH FOR MANAGEMENT

Recreational Fisherman Survey Approved

The Office of Management and Budget has approved the use of survey forms to be used in a study of the Southern and Central California partyboat passengers. The study was originally conceived last year, and the major data gathering phase was contracted to Center for National Ocean Inc., of Ojai, California with Dr. Daniel Huppert, Leader of the Commercial and Recreational Fisheries Research for Management program, as the contract representative. Huppert expects to complete the initial survey in San Diego in mid-September. If all goes well the survey will be repeated three times in order to cover late summer, winter, and early summer fishing. Data analysis and the final report should be completed by the end of 1979.

Data Gathered for Jack Mackerel Management Plan

Jane McMillan, Industry Economist, continued work on the economics sections of the jack mackerel management plan, gathering data on landings and values of jack mackerel and on production of various jack mackerel products. Gregg Pottoroff, a Sea Grant trainee, traveled with Ms. McMillan to Long Beach where they obtained landing data for all vessels that landed 100 pounds or more of jack mackerel, Pacific mackerel, anchovy, squid, and Pacific bonito, during the years from 1973 to 1976. They also obtained the landing data for bluefin tuna from the vessels that landed the above species. These data will be keypunched and be available for further analysis of these multi-species fisheries. McMillan is putting together data on the physical characteristics of all these vessels.

Using these data, McMillan has begun writing and revising the socio-economics section of the jack mackerel fishery management plan. This section will include information that McMillan gathered by contracting all the processors of jack mackerel in California, the Fisherman's Coop, and the two fishermen's unions.

McMillan also collected census data on San Pedro for inclusion in the area-community section, and spent a day discussing "under-utilized species"--specifically squid--with Jeff Tobolski for Earl Combs, Inc.

Dr. Gary Stauffer has also started working on the draft jack mackerel plan and has completed initial drafts for sections on the history of management of the foreign trawl fishery, revenues from the foreign fishery, and description of the foreign trawl fishery.

Aerial Fish Monitoring Program Continues

An airborne pelagic fish monitoring program was started by Fishery Biologist James Squire of the La Jolla Laboratory in 1962. The program contracts for the services of aerial fish spotter pilots operating off the California and northwestern Baja California coast for the commercial fleet, to maintain flight log records of their tract, and of species and quantities of fish observed. The objective of the program is to obtain measures of relative abundance of important sport and commercial pelagic species.

Flight logs are divided into two data bases: one for sighting records and one for effort records. In August, data bases for both sighting and effort were completed. Except for minor corrections, the data bases contain information for the years 1962 to 1977 inclusive.

Keith Parker, Statistician, and Joe Caruso, Mathematical Technician in the Extended Jurisdiction group, began analysis of the aerial survey log using a data management system which Caruso just completed. Their first study will compare the sighting power of different pilots, that is, their ability to spot fish, in the same way that a fishing power analysis compares the fishing ability of different vessels. The analysis will be used to index the relative abundance of the anchovy, based on pilot's sightings. This index will be compared to existing measures of relative abundance to determine its accuracy.

Of the 14 pilots reporting anchovy sightings for 1963 to present, only 6 supplied information consistent enough and complete enough to be considered in the analysis. The remaining 8 supplied less than 3% of the sightings; these sightings were usually clumped in a 2 to 4 week period. Mr. Parker and Mr. Caruso felt that no resolution was to be gained by including these sightings and that including them would probably result in imprecision.

Squire, Dr. Gary Stauffer and Caruso contacted aerial fish spotter pilots in August to review or set up contacts to obtain flight logs of their fish observations. Of the seven pilots under contract in FY 78, only two will continue to fly on a regular basis in 78-79.

Contracts have been sent to eight pilots of which five are expected to fly routinely. Two pilots are participating for the first time. The transfer of responsibility for this aerial marine resource monitoring program to Stauffer and Caruso is now complete with Squire serving as an advisor.

Egg and Larvae Data for Pacific Hake Delayed

Analysis of the 1978 CalCOFI egg and larvae data for Pacific hake was delayed in August pending the computer output of the Soviet survey by their research vessel, Ogon. The individual station data on hake larvae should be available in early September in time for the October meeting on the hake quotas for the 1979 PMP.

Manuscripts Underway

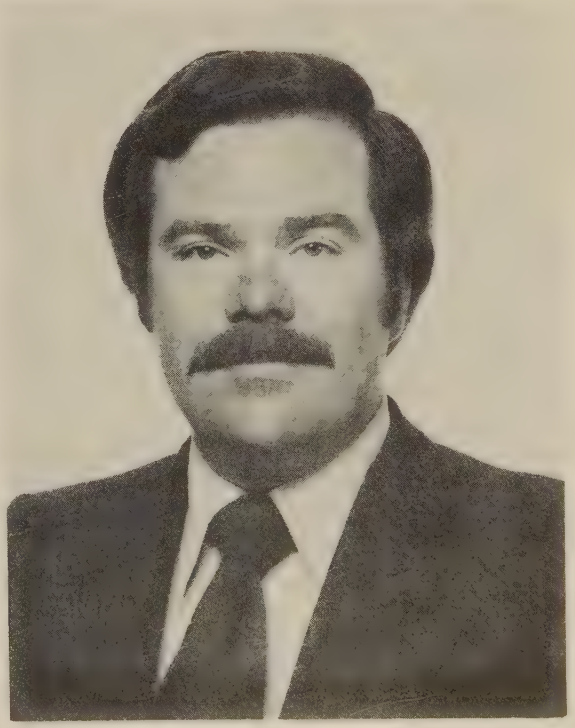
Keith Parker finished editing a draft of a paper entitled "Variable area transect estimation of population density," for the Journal of Wildlife Management. Parker added a more complete discussion of sampling non-random populations, a more complete discussion of conclusions, and an appendix that allows a more detailed reference to the analysis to be given in the paper.

Parker also finished a draft of a paper entitled, "Estimated spawning biomass from age composition."

Oceanic Fisheries Resources Division

William Fox Named Director of Southeast Fisheries Center

Dr. William W. Fox, Jr., Leader of La Jolla Laboratory's Oceanic Fisheries Resources Division, has been named Director of the National Oceanic and Atmospheric Administration's Southeast Fisheries Center in Miami, Florida, according to NOAA Assistant Administrator for Fisheries, Terry L. Leitzell.



As Director of the Center, one of four major research centers in the Fisheries Service, Dr. Fox will be responsible for laboratories in Miami; Galveston, Texas; Beaufort, North Carolina; Panama City, Florida; Bay St. Louis and Pascagoula, Mississippi; and Charleston, South Carolina.

Since 1975, Dr. Fox has been the Chief of the Oceanic Fisheries Resources Division at the Southwest Fisheries Center in La Jolla, California, where he has played a major role in the development of tuna policy and has been chiefly responsible for the direction and conduct of research programs on the tuna/porpoise interaction in the purse seine fishery in the eastern tropical Pacific.

Dr. Fox began his career in the National Marine Fisheries Service in 1967 at the same Center to which he has just been named Director. In 1972, he was transferred to La Jolla.

A native of San Diego, California, he received a B.S. in zoology from the University of Miami in 1967, and an M.S. from its Institute of Marine Sciences in 1970. In 1972, he was granted a Ph.D. from the University of Washington's College of Fisheries.

Dr. Fox, an expert on tunas, presently serves on the Scientific Committee of the International Commission for the Conservation of Atlantic Tunas, as technical advisor to the U.S. Delegation to the Inter-American Tropical Tuna Commission, and as a member of the Eastern Pacific Tuna Group, the latter formed to advise the government on alternative methods of tuna management. He has authored many scientific papers, most of them dealing with the application of statistical methods to the study of exploited animal populations, and is a member of a number of professional and scientific organizations.

Dr. Fox is married to the former Soledad Milord. They have two children, a daughter, 9, and a son, 7.

MARINE MAMMAL ASSESSMENT AND MONITORING PROGRAM

Issues of Quantitative Natural Resource Management Explored in Parma Conference

Dr. Joseph E. Powers, Leader of the Marine Mammal Assessment and Monitoring Program, attended the International Statistical Ecology Program July 31 through August 4 in Parma, Italy. This session of the program was arranged by Drs. C.S. Holling and C.A. Shoemaker, and addressed issues of quantitative natural resource management. Sessions were attended by an international group of about 40 scientists and were conducted in an informal workshop-type atmosphere which promoted interaction of the subjects.

Much of the discussion centered on methods for adapting large-dimensional complex models to be compatible with policy-determining procedures such as dynamic programming and linear programming. Adapting a model includes both aggregation of state variables and devising efficient alogorithms for search for optimal policies.

Other subject matter included parameter estimation for analytic models, dynamic pricing of harvestable resources, catastrophe representations of resource interactions, and adaptive control methods for utilizing policies determined from models with minimal data. This latter subject was particularly intriguing in that it deals with choice of a policy which is formally modified by the degree of uncertainty associated with it. For example, the stock size which produces the maximum yield (S^*) has an estimate ($\hat{S}^*$). But this estimate is affected by uncertainty in the form of the number of years of data, the variation within the recruit data, and range of stock sizes that have occurred, i.e., the relative position on the stock-recruitment curve that the data have been obtained. Using adaptive control methods, a stock size policy is chosen ($\bar{S}^*$) incorporating the uncertainty such that long-term yields are maximized. However, for the early years $\bar{S}^*$ does not necessarily equal $\hat{S}^*$. Uncertainty may dictate that the policy be different than the estimate, in order to reduce uncertainty and allow higher yields at subsequent times.

Two schools of thought on model development were expressed during the discussions. One group tended toward large, complex simulation models depicting essentially all that is known about the ecosystem. By exercising the model, experience is derived for developing simplified, more comprehensible concepts which could later be incorporated into management decision frameworks. The other school wished to start with the simplified models, gather insight and experience from them and develop more complex forms as needed. It seems that the dichotomy is largely one of data availability because the former group is involved with terrestrial systems for which more data are often present. Whereas, the latter group is dealing with marine systems with their inherent paucity of data. It was generally agreed that choosing the "optimal complexity" of the model, i.e., merging the two schools of thought, is a productive direction of research. Perhaps, adaptive control approaches and filtering concepts expressed during the conference are the vehicles for doing this.

In line with the same subject of modeling ecosystems, Powers met with Robert Scott of the Washington office and Felix Favorite, Taivo Laevastu, and Richard Marasco of Northwest and Alaska Fisheries Center and Richard Parrish of PEG, in Seattle on August 22. The meeting was called by Scott in order to develop a "white paper" on the direction of ecosystem modeling research within NMFS. The impetus for preparation of this document was supplied by the directive of Terry Leitzell, NOAA's Assistant Administrator for Fisheries. The white paper will provide him with information on expected payoffs, costs, and constraints of an NMFS effort in the variety of aspects of ecosystems analysis research. The participants of this meeting prepared materials to draft the document which will be reviewed within NMFS before presentation to Leitzell.

TUNA RESOURCES PROGRAM

Tuna Vessel Participation in Fax Advisory Program

During August 1978, the crews of 25 tuna seiners contributed synoptic weather and XBT (expendable bathythermograph) data to the NMFS FAX Advisory Program. A total of 232 weather and 29 XBT observations were reported via NMFS-licensed radio station WWD. The chart below lists data pertaining to activity in the program during August, 1975-1978 and shows that the reporting level in 1978 was higher than it has been during August since 1975.

	August			
	1975	1976	1977	1978
Number of vessels with equipment	75	75	61	50
Number of vessels reporting	29	22	20	25
Number of weather observations reported	268	225	199	232
Number of XBT observations reported	38	25	19	29
Monthly observation total	306	250	218	261

Leading program participants this month were Captain Ralph Silva of the dedicated vessel Queen Mary (8 weather and 13 XBT observations), Captain Manuel Jorge of the Maria C J (20 weather observations) and Captain George Sousa of the Raffaello (19 weather and 1 XBT observations). We extend our appreciation to these and all other contributing participants.

Program Participants Collect Data on Swordfish and Marine Mammals

A swordfish observer program under the leadership of Fishery Biologist James Squire was launched on August 25 when Fishery Biologist Earl Weber conducted a pilot study aboard the commercial swordfish vessel, Invader. Despite the importance of swordfish to both commercial and sport fishermen, little is known concerning the biology of this species. Under the program, observers will be placed aboard cooperating vessels to collect data that will be used to establish length-weight relationships, determine feeding habits, sex ratios, maturity (gonad) indices, fecundity estimates, and other information important to understanding swordfish. The trained observers will also collect data on marine mammals in southern California waters.

"Fishing Information" Issued

The July issue of "Fishing Information" went to press on August 23 and was issued on August 31. Two albacore supplements with attached sea surface temperature analyses were mailed to subscribers.

* * * * * * * * * *

Division Chief Attends Meeting on Renegotiation of Tuna Commission

Dr. William Fox, Leader of the Oceanic Fisheries Resources Division, was in Mexico City on August 8-10 for meetings among the U.S., Mexico and Costa Rica on renegotiating the present Inter-American Tropical Tuna Commission convention.

PACIFIC ENVIRONMENTAL GROUP

OCEAN CLIMATOLOGY AND MONITORING

Routine Data Services

One of the missions of the Pacific Environmental Group is to provide fisheries researchers and managers with environmental data, data products and analyses that are available at the Navy's Fleet Numerical Weather Central (FNWC). FNWC is the only forecasting center in the U.S. that forecasts marine weather and oceanographic conditions on a global, real time basis. To support these analyses, FNWC has assembled a wide variety of ocean data including marine weather observations, bathythermograph data, oceanographic station data, and a number of satellite-derived data sets.

Many of these data are useful for fisheries purposes. Of primary interest are observations of sea surface temperature and surface wind velocity as well as other meteorological properties that are involved in heat and momentum exchange processes across the sea surface. Some of the data are useful for climatic studies since some of the time series are of long enough duration to extend back into the last century.

PEG has developed computer programs to access these data files and to provide averages, anomalies, and other data displays. Additionally, PEG is producing derived parameters such as the upwelling indices and other wind-induced flow parameters at specified locations along the U.S. and Canadian west coast extending into the Gulf of Alaska. In general, the data products cover areas of specific U.S. fisheries interest although with the availability of global data, products for any ocean area can be obtained.

Some of the products provided by PEG are listed below together with the time and space coverage. Many of the products are maps or graphs but increasingly numerical values are desired for input to mathematical models.

Product	Time Covered	Area Covered
Marine Climatic Conditions (air and sea temperature, surface pressure, 500 mb. height.	Week	Regional and ocean wide
Sea Surface Temperature		
Maps	Month	Regional and ocean wide
Time series	Decades	1 degree squares
Contour isograms	Year	Coastal sections
Wind Parameters		
Index of Ocean Upwelling	6 hour, day, week, or month	Locations along West Coast
Ocean Transport Calculation	Month	Atlantic and Pacific Oceans
Sea Level (from National Ocean Survey)	Month	Stations along U.S. coasts.

A number of these products are produced routinely and sent to researchers at the NMFS Center laboratories and the Atlantic Environmental Group. A substantial portion of the data services, however, are in response to special requests from these laboratories. PEG is also cooperating with State fisheries departments and universities on projects pertinent to U.S. fisheries problems. Although these services are a substantial part of our efforts, they support the work of others and do not appear in PEG publications. By our cooperative efforts with researchers at other organizations, our effectiveness is materially increased above what PEG could contribute alone.

OCEAN MODELING AND FORECASTING

Three translations from the French have been made by Paul Sund with the assistance of Mrs. G. Burnand. These articles discuss environment-tuna relationships near West Africa. Environmental data are gathered by ships and aircraft, analyzed in near real time and relayed to the fleet for use in fishing operations.

Abstracts of the three articles follow:

Doc. Scient. Centre Rech. Oceanogr.
Abidjan. Volume IV, No. 3, Sept. 1973, pp. 99-142.

Thermic and thermohaline fronts in the region of Cape Lopez (Gulf of Guinea) June - July 1972: Phytoplankton, Zooplankton, Micronekon, and Tuna Fishing

by

P. Dufour & J-M. Stretta

Abstract

Surface temperature was measured with two ships and one aircraft through Cape Lopez frontal region. The main front was limited by cold and saline waters southwards and warm and less saline waters northwards. South waters were enriched by the coastal part of Benguela current and by upwellings along Congo and Gabon. Northern waters were poorer. The movements of this thermohaline front were studied during June and July 1972. Vertical distribution profiles of physical parameters (T, S, σt, O_2), Chlorophyll "a", and zooplankton were drawn along 4 transects through the highest density gradients. Counts of micronekton and chemical analysis were also made along one transact. The thermohaline front was sharpest when moving northwards from mid-July. A divergence on its warm northern boundary of the front inside waters warmer than 23°C. From mid-July the thermohaline front started moving southwards and became less sharp and poorer in chlorophyll "a". At the same time, tuna fishing got scattered. Secondary fronts were detected north of the main one, inside warm waters. They were characterized only by temperature gradients, salinity being uniform. Tuna concentrations were also observed there.

Deep Sea Fishing, 54th Year, No. 1167, June 1975

Technological Progress in Fisheries
Aerial teledection and fishing strategy

by

J. Noel and J.M. Stretta

Abstract

Use of aerial sensing of sea surface temperature enables the detection of thermal fronts. These are mapped and, using additional oceanographic information, daily advisories are prepared and transmitted to the fishing fleet to increase their efficiency in locating areas of potential tuna concentrations. This prototype operational program has found successful application in the Cape Lopez area of West Africa.

Doc. Scient. Centre Rech. Oceanogr. Abidjan
Volume VI, No. 2, Nov. 1975, pp. 59-74.

Characterization of Hydro-Biological situations
& Potential for Tuna Fishing at Cape Lopez
in June & July 1972 and 1974

by

J.M. Stretta, J. Noel, and L. Vercesi

Abstract

Surface temperature was measured by remote sensing through the Cape Lopez frontal region during the fishing season in June and July 1972 and 1974. Twelve typical situations are analysed through four main directions: 1) surface situation, 2) tendency, 3) hydro-biological structure, and 4) availability to fisheries. The tuna behavior is analysed in relation to the frontal zone movements and a mechanism which tends to aggregate important shoals of tunas is presented.

TIBURON LABORATORY

FISH COMMUNITIES INVESTIGATION

Food Preferences in Blue Rockfish Established

Under appropriate circumstances the blue rockfish, Sebastes mystinus, feeds heavily on algae, particularly sori (reproductive tissue) of the bull kelp, Nereocystis. This is a remarkable food for a member of a family as strongly carnivorous as the Scorpaenidae. It is widely known that the blue rockfish is primarily a zooplanktivore that feeds heavily on gelatinous forms like salps. At Albion this month Dr. Edmund Hobson, Mr. Tony Chess and Ms. Tina Echeverria examined preferences for these widely differing food types. Because of a variable pattern of coastal upwelling, zooplankters were relatively sparse in the nearshore waters early in the month, and at that time, Nereocystis sori were a major food. Later, however, zooplankters became plentiful, both in the water and in the diet of the blue rockfish. The sori, although as available as before, were not taken as food at this time.

Tag Shedding Rates of Brown Rockfish Analyzed

W. MacNaughton, a graduate student at San Francisco State University, has been analyzing results of tagging of brown rockfish at the laboratory waterfront for his Master's thesis. He has nearly completed a study on tag shedding rates using standard techniques. His analysis indicated problem areas that could be answered through use of a simulation model which is close to completion. The model will have practical implications not only for the brown rockfish study, but for tag shedding studies in general. In addition to his thesis work, MacNaughton has developed computer software that will greatly aid in other analyses of the tagging data.

Groundfish Management Plan Development Team Meets

The Groundfish Management Plan Development Team met at the Tiburon Laboratory August 28-30 to revise the plan prior to its submission to the Pacific Fishery Management Council at its October meeting. The lack of a satisfactory analysis of and proposed management plan for the hake fishery was discussed. Dr. W. Lenarz will begin work on the analysis and plan during the coming month.

Studies of the Fish Communities Investigation Featured on "Wild Kingdom"

Studies of predator/prey relationships on coral reefs by the Tiburon Laboratory's Fish Communities Investigation are to be the basis of an episode of the TV series Wild Kingdom. Dr. Hobson, who did this research in Baja California and Hawaii several years ago, joined Dr. Marlin Perkins and members of the Wild Kingdom production crew in the Bahamas for filming this month (Figure 1). The show is scheduled for airing late in the coming season.

Figure 1. Dr. Marlin Perkins (left) and Dr. Hobson, in the Bahamas this month, discuss filming a Wild Kingdom episode based on studies of the Tiburon Laboratory's Fish Communities Investigation.

Computer Program Summarizing Rockfish Catches Completed

Candis Cooperrider, Biological Technician, has completed a computer program which summarizes sport rockfish catches using methodologies developed by P. Tomlinson under a contract to the Tiburon Laboratory. The program estimates catches of rockfish by port, month, species, sex, length, and age from data collected by the California Department of Fish and Game under a contract with the Laboratory. Variances of the estimates are produced and decomposed into within-trip and among-trip components. The decomposition allows examination of allocation of sampling effort among trips and fish per trip. Development of a similar program for commercial catches is in progress.

FISHERIES DEVELOPMENT INVESTIGATION

Local Fisheries Development

Sus Kato aided a fisherman and buyer in planning a processing plant in the Bay area for red sea urchins. Apparently urchins are available throughout the winter in some localities, and when prices are favorable a fishery may be feasible. Winter storms have foiled other attempts to establish sea urchin plants on the north coast.

Mr. Kato traveled to Bodega Bay to board the trawler, Cape Windy, to once again test the net monitor which has been installed on our midwater rockfish trawl. An electronics technician from the Furuno Company (Japan), a local distributor of the instrument, and Bruce Wyatt of Sea Grant also participated in the trials. The net monitor performed satisfactorily for the first time, and the fisherman will begin actual fishing trials when conditions are favorable.

Recreational Fisheries Improvement

The first silver salmon began returning to the pen-rearing site at the Tiburon Laboratory this month. Three salmon were captured in eight gill net sets. For the remainder of the season, the gill net will be set twice instead of once a week to better monitor returning fish. Last year, returns to the pen site did not occur until September.

Eleven more king salmon tags from the Tiburon Laboratory's fall 1976 release were recovered from the ocean fishery this month.

Analysis of weight samples of the king salmon currently being reared indicated that growth during this month was slightly less than the doubling rate reported for the initial four-week period. Inventory of one pen into which 50,000 king salmon were placed revealed a 75% loss

after two months. Observed mortality was slight during this period, and the loss can be primarily attributed to a combination of small fish and large net mesh size. These salmon are "extra" and their loss will not affect our studies.

Changes in Angling Techniques

Susan Smith, Fishery Biologist at the Tiburon Laboratory, continued her revision of the paper "Changes in angling equipment and methods in California." She also traveled to Monterey to meet with a group of sportfishing boat captains who provided her with information on changing methods in the rockfish fishery off Monterey. It appears that the two most significant changes were 1) the conversion from handlines to rod and reel (1937-1950), which permitted boats to fish in deeper water, and 2) the switch from baited 1-to-3 hook rigs to multi-jig rigs (introduced about 1957). The multi-jig rig consists of 4 to 6 yarn-adorned jigs which are often fished without bait. With this new rig, catches reportedly increased, especially catches of schooling pelagic species such as the blue, yellowtail and olive rockfishes.

PHYSIOLOGY INVESTIGATION

Striped Bass Task

Work continued on the analysis of samples taken from adult striped bass during their spawning season, and from laboratory experiments with eggs and larvae at the Tiburon Laboratory. Dr. Jeannette Whipple worked with Dr. Joseph Cech from U.C., Davis on the identification and differential counting of blood cells of adult striped bass in samples taken before, during and after spawning. The large number of white blood cells and high concentrations of granulocytes and other types indicates an extremely high level of stress in this species during spawning. This is also indicated by the high incidence of infectious diseases and parasites in spent females. Sampling of adult striped bass in San Francisco Bay is continuing, and a large sample of non-spawning adult fish and young juveniles will be taken this fall for comparison of the same parameters.

The physiology staff learned a number of useful techniques, primarily in respiratory and cardiovascular dynamics, from Cech during his stay at Tiburon. These techniques should prove useful in measuring effects of sublethal stress from pollutants.

Fishery biologist Mickey Eldridge presented a paper titled, "Laboratory studies on factors affecting mortality in California striped bass (Morone saxatilis) eggs and larvae" at the annual meeting of the American Fisheries Society, Kingston, Rhode Island. The overview paper

outlined results from three years of laboratory studies and supported our hypotheses that inherent and environmental factors contribute to mortality of striped bass eggs and larvae.

Gary Grossman, a graduate studient from U.C., Davis, is using part of the Physiology Laboratory facilities for the completion of his Ph.D. thesis on fish behavior and will be working at Tiburon Laboratory for approximately six months.

OCSEAP Petroleum Task

The final report to OCSEAP for research entitled, "Transport, retention, and effects of the water-soluble fraction of Cook Inlet crude oil in experimental food chains" was submitted to the ERL, OCSEAP office in Juneau, Alaska. The project has been officially terminated. Several manuscripts resulting from this research are in preparation.

SEMINARS

Honolulu Laboratory

August 28 - Dr. Kazuo Fujino, Kitasato University, Japan, spoke on "Genetic study of the Pacific abalone."

La Jolla Laboratory

August 24 - Supervisory seminar on "Selective Placement and the Supervisor."

29 - Kenneth S. Raymond, Scientific Illustrator, presented a narrated tape-slide show of activities and organization of the four Center laboratories.

HONORS AND AWARDS

La Jolla Laboratory

Fred Kellenberger, Data Systems Manager for the Southwest Fisheries Center Laboratory, was nominated to the Federal Automatic Data Processing Council Executive Board on July 26.

Center Director Izadore Barrett was reappointed to serve on the Marine Technology Advisory Committee of San Diego Community Colleges for the coming year, 1978-79.

Alec MacCall, an Associate Marine Biologist with California Department of Fish and Game's Operations Research Branch stationed at the SWFC in La Jolla, was honored at the August principal officers meeting in Sacramento for his work in developing the anchovy management plan. Since March 1973, MacCall has worked as one-half of a two-man team on stock assessment of several southern California sport and commercial marine species. His knowledge of population dynamics has been drawn upon heavily by the DFG and the Pacific Fisheries Management Council, which has adopted the anchovy management plan. MacCall recently presented a paper on population models contained in the plan to an international symposium on pelagic fish stock management in Scotland.

Shown at left is E. Charles Fullerton, Director of the California Department of Fish and Game, presenting a Certificate of Recognition to MacCall for his contribution to the preparation of the Anchovy Management Plan.

TRAINING

Fishery Biologist Sus Kato of the Tiburon Laboratory, participated in a course on Applied Supervision at the National Independent Study Center in August.

MEETINGS AND TRAVEL

August 1-2 - Sus Kato of the Tiburon Laboratory traveled to Seattle to meet with Richard McNeeley of the Northwest & Alaska Fisheries Center and a commercial net maker to discuss and design plans for a midwater pair trawl. Bids have been requested for the construction of the trawl, pending the receipt of S-K funds.

2-3 - Kato traveled to San Diego to confer with the fisherman who will be using the pair trawl this winter in connection with efforts to develop a fishery for shortbelly rockfish. The net may also be used next summer to catch hake.

2-4 - R. Shomura, Director of the Honolulu Laboratory, attended the 12th meeting of the Western Pacific Regional Fishery Management Council meeting at Kailua-Kona. The Council session, held on 3-4 August was preceded on August 2 by a meeting of the advisory panel and the chairmen of the various planning teams including Dr. Skillman and R. Uchida of the Honolulu Laboratory. Other participants from the Honolulu Laboratory included Drs. Michael F. Adams and Roy Mendelssohn.

6-12 - Dr. William Fox, Leader of the Oceanic Fisheries Resources Division at the La Jolla Laboratory, traveled to Mexico City, Mexico to participate in a meeting on renegotiating the IATTC. Dr. Fox reports that the participants in the meeting seemed to be in agreement on most points, except for the principles of sovereign rights of coastal states over migratory fish and the amount of allocation to various countries.

7 - Dr. Edmund Hobson of the Tiburon Laboratory traveled to the Bahamas to participate in filming an episode of the TV series "Wild Kingdom" based on Dr. Hobson's studies of predator-prey relations among fishes on coral reefs.

August 8-9 - Dr. W. Lenarz, Fishery Biologist at the Tiburon Laboratory, traveled to Seattle to attend a meeting of the Groundfish Management Plan Development Team.

8-10 - Center Director Izadore Barrett, traveled to Renton, Washington to attend the Pacific Fishery Management Council Scientific and Statistical Committee meeting.

9-11 - R. Holt, Dr. D. Au, and F. Iorio of the La Jolla Laboratory traveled to Los Angeles to attend a class in regression analysis at UCLA given by the BMD statistical package people.

10 - Ms. Jane McMillan of the La Jolla Laboratory traveled to Long Beach to collect data from California Department of Fish and Game on jack mackerel, anchovy, bonito, and bluefin.

10-11 - Jim Squire of the La Jolla Laboratory traveled to Renton, Washington to attend the Pacific Fishery Management Council meeting.

14 - Dorothy Roll of the La Jolla Laboratory traveled to Long Beach to meet with California Department of Fish and Game and GSA personnel to discuss keypunching 1977 and 1978 landing data and to review specifications for computer programming for the Coastwide Data System Base Level 2 data.

14-15 - Mr. Shomura attended portions of a 2-day Tuna Research (Histamine) Workshop convened by Dr. Hilmer Frank, University of Hawaii, in the Honolulu Laboratory conference room. Other participants from the Honolulu Laboratory included Dr. Andrew E. Dizon and Bernard M. Ito.

14-16 - Dr. Reuben Lasker, Leader of the Coastal Fisheries Resources Division at La Jolla Laboratory, traveled to Seattle, Washington to develop a white paper with NWAFC personnel on pollution.

- Dr. Gary Sakagawa of the La Jolla Laboratory in Galveston, Texas to participate in review and planning of Atlantic bluefin tuna stock assessment.

16 - Shomura met with Dr. Y. Hokama, University of Hawaii, and others regarding S-K funding for a ciguatera project.

August 16-17 - Jim Squire, Gary Stauffer, and Joe Caruso of La Jolla Laboratory traveled to Santa Maria and Santa Barbara, California to meet contract fish spotters and set up new contracts.

16-18 - Shomura traveled to La Jolla, California to discuss Honolulu Laboratory reorganization and other matters with Center officials. He also had an opportunity to meet with industry people in San Diego to discuss data needs for the Billfish Fishery Management Plan and the Stock Assessment Workshop to be held next year.

17 - Kathy Setbacken, PEG, traveled to Monterey to discuss the XBT program with PEG staff in Monterey.

- Alec MacCall of the La Jolla Laboratory traveled to Sacramento to attend a meeting of the principal officers of California Department of Fish and Game where he received an award for his work on the Anchovy Management Plan. (see page 26).

21-22 - Dr. Richard Parrish, PEG, traveled to Seattle, Washington to attend an NMFS workshop on Ecosystem Models at NWAFC.

21 - Shomura attended a meeting in the Honolulu Laboratory conference room to discuss sea turtles with representatives from the Western Pacific Program Office (WPPO), Hawaii State Marine Affairs Coordinator's Office, and the Institute of Marine Biology, University of Hawaii.

21-22 - Dr. Joseph Powers, Leader of the Marine Mammal Assessment and Monitoring Program at La Jolla Laboratory, traveled to Seattle to meet with NWAFC personnel to develop a white paper on research thrusts of NMFS in ecosystem multi-species modeling.

21 - Susan Smith of Tiburon Laboratory traveled to Monterey to interview sport boat captains about changing angling techniques in the recreational bottom fishery in that area.

21-25 - Mickey Eldridge of the Tiburon Laboratory attended the National AFS meeting at Kingston, Rhode Island, and presented a paper on striped bass.

22-24 - Dr. Robert Skillman of Honolulu Laboratory traveled to La Jolla to work with Mr. David Mackett to finalize the draft Honolulu Laboratory tuna plan.

August 22-28 - Shomura and Doyle E. Gates, Administrator of WPPO, traveled to Pago Pago, American Samoa and met with Henry Sesepasara, Office of Marine Resources, Government of American Samoa, and others to discuss fishery programs.

28-30 - Bill Lenarz of the Tiburon Laboratory participated in a meeting of the Groundfish Management Plan Development Team at the Tiburon Laboratory.

28-31 - Shomura attended the Scientific and Statistical Committee meeting in Kailua-Kona. Dr. Michael Adams and Dr. Roy Mendelssohn of the Honolulu Laboratory also attended the meeting.

31 - Mrs. Hazel Nishimura, Librarian at the Honolulu Laboratory, was in Manila, Philippines, to assist with the organization of a library for ICLARM and to acquaint the new ICLARM Librarian with fishery literature.

VISITORS

Honolulu Laboratory

August 3 - Warren H. Keenan, USFGGE Project Office, Rockville, Maryland, visited Acting Director Otsu.

4 - Sigeru Motoda, Tokai University and Dr. S. Arasaki, Nihon University, visited Mr. Otsu.

7 - Shigeo Hikosaka, President Sanyo Hydrographic Co., Tokyo, who was formerly with the Japan Hydrographic Office and spent a year at Honolulu Laboratory as a visiting scientist about 20 years ago, visited Mr. Otsu.

8 - Robert K. Kearney, South Pacific Commission, Noumea, New Caledonia.

14 - John Mulligan, Tuna Research Foundation, Washington, D.C.

- George and Patricia Mattson, La Jolla, California.

21 - Robert Gillett, South Pacific Commission, Noumea, New Caledonia, together with James Prescott and Richard Kinney, Honolulu, Hawaii.

28 - Dr. Kazuo Fujino, Kitasato University, Japan.

La Jolla Laboratory

August 14 - Patrick Echlin, University of Cambridge, England.

- Del Russ, Capital Marketing Consultants, La Jolla.

- Phil Hudsell, NODC.

15 - Shirley Schmidt, NMFS Southwest Region, Terminal Island.

- Walburga L. Giguere, Tiburon Laboratory.

21 - Alan Macnow, Telepress Associated, New York, New York.

23 - Dr. R. Skillman, Honolulu Laboratory.

- Dr. Carl Sindermann, NMFS, Sandy Hook, and Dr. D. Malins of Seattle met with Dr. R. Lasker to discuss the second chapter of the proposed white paper on pollution.

24 - Robert Clarke, Autonomous University, Ensenada, Mexico.

Pacific Environmental Group

August 4 - Dr. Steve Pazan, Scripps Institution of Oceanography, La Jolla, California.

16-17 - Dr. Warren White, Dr. R.L. Bernstein and Michael Guberck, Scripps Institution of Oceanography, La Jolla, California.

29 - Forrest Miller, IATTC, La Jolla, California.

Tiburon Laboratory

August 3 - Assemblyman Barry Keene, Sonoma County, California.

- Zeke Grader, Manager, Pacific Coast Federation of Fishermen's Associations, Sausalito, California.

4 - R. Beland, California Department of Fish and Game, Sacramento, California.

- Robert R. Rawstron, California Department of Fish and Game, Sacramento, California.

14 - Stan Gallagher, San Francisco State University, San Francisco, California.

August 14 - Michael Simmons, San Francisco State University, San Francisco, California.

15 - Pat O'Brien, California Department of Fish and Game, Sacramento, California.

- B. Tillott, I.D.M., Alpine, California.

- C. Cordiper, I.D.M., Oakland, California.

21 - Richard Lee, California Department of Fish and Game, Menlo Park, California.

- Ann Cesta, Ichthyology Department, U.C., Berkeley, California.

25 - Jeff Tobolski, Earl R. Combs, Inc., Mercer Island, Washington.

28 - Gary Grossman, Department Wildlife & Fisheries Biology, U.C., Davis, California.

- Lynn Decker, Department Wildlife & Fisheries Biology, U.C., Davis, California.

- Don Gunderson, NWAFC, Seattle, Washington.

- Al Milliken, Washington Department of Fisheries, Seattle, Washington.

- Tom Jow, California Department of Fish & Game, Menlo Park, California.

- Bob Demory, Oregon Department of Fish and Wildlife, Newport, Oregon.

PERSONNEL

July 31 - George Liao, Operations Research Analyst - Full time permanent transfer from Washington, D.C. - Honolulu

August 7 - Tim Smith, Fishery Biologist, previously assigned to duty at the Honolulu Laboratory, began work at the La Jolla Laboratory in the Marine Mammal Assessment and Monitoring program.

13 - Hilary Hogan, Physical Science Aid, Conversion to 130-day appointment - La Jolla

August 13 - Dr. Joseph Powers, Operations Research Analyst and Leader of the Marine Mammal Assessment and Monitoring program, Promotion - La Jolla.

14 - Michael F. Johnson, Economist, Full-Time temporary appointment - Honolulu.

14 - William MacNaughton, Jr., Biological Technician, Temporary Appointment - Tiburon.

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